



United States Department of the Interior



FISH AND WILDLIFE SERVICE
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IN REPLY REFER TO:
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November 8, 2016

Herb Pollard, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, #101
Portland, Oregon 97220

Subject: Agenda Item G.4 – Northern Anchovy Stock Assessment and Management Measures

Dear Mr. Pollard and Council Members:

The U.S. Fish and Wildlife Service (USFWS) appreciates the opportunity to comment on Agenda Item G.4 – Northern Anchovy Stock Assessment and Management Measures. We thank the Pacific Fishery Management Council (Council) for identifying stock assessment of the central subpopulation of northern anchovy (*Engraulis mordax*) as a priority and for placing consideration of revised anchovy harvest specifications, management measures, and management category on the November agenda. We urge the Council to take immediate action to protect the central substock of northern anchovy and its dependent marine predators while a full stock assessment is underway. We believe that this precautionary approach is warranted in light of the numerous sources of scientific information indicating low northern anchovy biomass over the past several years and its limited availability to California brown pelicans (*Pelecanus occidentalis californicus*) and other marine predators in the California Current Ecosystem (CCE).

We have previously outlined our concerns regarding the availability of northern anchovy to brown pelicans and other marine predators in the CCE (USFWS 2015, USFWS 2016), and we reiterate the basis for those concerns here. California brown pelicans range as far north as British Columbia but breed from the California Channel Islands south to Guerrero, Mexico (Anderson et al. 2013). Approximately 17 percent of the population nests in the Southern California Bight (SCB) at five colonies, the largest of which is at Anacapa Island. In the past several years, brown pelicans in the CCE have been affected by low forage availability in both their non-breeding and breeding range.

In their non-breeding range, brown pelicans have some flexibility in choosing loafing sites near concentrations of prey, and they also have some flexibility in the species they consume, which include not just northern anchovy but other small schooling fishes, such as Pacific sardine (*Sardinops sagax*) and Pacific mackerel (*Scomber japonicus*) (USFWS 1983, Gress et al. 1990). Despite this geographic flexibility and the ability to switch prey, California brown pelicans experienced mortality events attributed primarily to emaciation or starvation in 2009 and 2010

(Nevins et al. 2011) and have also exhibited unusual behaviors, such as preying on common murre (*Uria aalge*) chicks or violently shaking them to force regurgitation (McChesney 2013, Horton and Suryan 2012, Jaques 2014), indicating that the availability of other forage fishes as alternate food sources was inadequate. Increased scavenging by brown pelicans in harbors and plumage contamination with fish oils have also occurred in association with anomalously low coastal pelagic prey indices (Jaques 2014).

Within their breeding range in the SCB, brown pelicans are heavily dependent on the availability of anchovies within 30-50 kilometers of the colony during the breeding and pre-breeding periods (Anderson et al. 1982, Gress 1980, Harvey 2008, USFWS 1983). Brown pelicans have experienced a series of years of poor breeding success in the SCB from 2009 on, with the latest available data for the Channel Islands (2015) indicating total numbers of young fledged at less than half the long-term mean for Anacapa Island and less than one quarter the long-term mean for Santa Barbara Island (USFWS 2016).

Numerous other ecosystem indicators point to the fact that northern anchovy has been at low biomass levels for the past several years. A 25-year decline in overall seabird abundance has been attributed primarily to a decline in northern anchovy (Sydeman et al. 2015). Brandt's cormorants (*Phalacrocorax penicillatus*) breeding in central California exhibited a sharp decline in nest numbers and reproductive success in 2008, with small breeding population sizes and poor productivity continuing through 2012 (Bechaver et al. 2013, Warzybok et al. 2013, Fuller et al. 2014). A major die-off of Brandt's cormorants in spring 2009 was determined to be associated mostly with starvation (Gibble et al. 2010). Analysis of regurgitated pellets showed a sharp decline in the representation of northern anchovy in the diets of Brandt's cormorants beginning in 2008 (Elliott et al. 2015), the same year that breeding numbers and productivity declined. While some evidence exists of local availability of young-of-the-year northern anchovy in 2015 (which accounted for more than 90 percent of the diet of rhinoceros auklets at Año Nuevo Island that year, leading to high reproductive success; Beck et al. 2016), other evidence indicates a widespread pattern of continuing low prey availability. In fall 2015, an unprecedented die-off of primarily young-of-the-year common murre (*Uria aalge*) occurred along the Pacific Coast, resulting in beached bird rates 6-28 times higher than normal (Gibble et al. 2016).¹ Limited prey abundance or availability is believed to have been the primary cause of the event, although domoic acid exposure and increased murre population size may have been contributing factors (Gibble et al. 2016). The California sea lion (*Zalophus californianus*) Unusual Mortality Event in California, which has been attributed to low availability of energy-rich forage such as Pacific sardine (*Sardinops sagax*) and northern anchovy (McClatchie et al. 2016; <http://www.nmfs.noaa.gov/pr/health/mmume/californiasealions2013.htm>), has persisted through 2016. Ecosystem indicators of low northern anchovy biomass corroborate the results of analyses based on ichthyoplankton surveys (MacCall et al. 2016) and spatially weighted egg-production estimates (NOAA 2016) that biomass of the central subpopulation of northern anchovy has been low since approximately 2008.

One of the stated goals and objectives of the Coastal Pelagic Species Fishery Management Plan is to “[p]rovide adequate forage for dependent species” (Council 2011), and as we noted

¹ Northern anchovy typically represents at least 10 percent of the adult diet and (along with Pacific sardine) 53 percent of the chick diet (Roth et al. 2008).

previously (USFWS 2015), our 2009 decision to delist the California brown pelican was based, in part, on our assessment that “food supplies are assured by the Coastal Pelagic Species Fishery Management Plan” (74 FR 59444, November 17, 2009). In terms of its occurrence in the diets of major predatory species in the CCE, northern anchovy (juvenile and adult) ranks as the most important forage species (Ainley et al. 2014). In terms of connectedness in the food web, particularly the number of predators that feed on it, northern anchovy ranks first (Koehn et al. 2016) or second (Szoboszlai et al. 2015). Whereas ecosystem drivers are the primary determinant of northern anchovy biomass in any given year (Baumgartner et al. 1992), fishery impacts on the stock itself, as well as on brown pelicans and other dependent species, are likely to be magnified when biomass is low, particularly when other important forage species are also at low levels of abundance (Essington et al. 2015, Koehn et al. 2016).

It appears that months or even years may be required for an integrated stock assessment to be developed, reviewed, and utilized as a basis for management decisions. In the interim, we urge the Council to utilize the best available scientific information as the basis for its determination whether updated management measures are needed. Specifically, we urge the Council to evaluate whether the current Annual Catch Limit (ACL) of 25,000 metric tons is sufficiently protective of the stock and its ecological functions given the multiple sources of scientific information indicating that northern anchovy biomass remains low. If the Council is uncertain whether the current ACL is sufficiently protective, we urge the Council to adopt a precautionary approach and adopt revised harvest specifications before the start of the 2017 fishing season. Further, we ask the Council to adopt a longer-term approach to management of northern anchovy that is sufficiently responsive to fluctuations in biomass and the spatial needs of place-based foragers to ensure an adequate forage reserve for California brown pelicans and other dependent predators, particularly in times of scarcity.

We thank the Council for its continuing commitment to ecosystem-based management of fisheries. If you have questions regarding this letter, please feel free to contact Lilian Carswell, of my staff, at (805) 612-2793 or Lilian.Carswell@fws.gov.

Sincerely,



Stephen P. Henry
Field Supervisor

Literature Cited

- Ainley, D., P. Adams, and J. Jahncke. 2014. Towards ecosystem based-fishery management in the California Current System – predators and the preyscape: a workshop. Unpublished report to the National Fish and Wildlife Foundation. Point Blue Conservation Science, Petaluma, CA. Point Blue contribution number 1979.
- Anderson, D.W., F. Gress, and K.F. Mais. 1982. Brown pelicans: influence of food supply on reproduction. *Oikos* 39:23-31.
- Anderson, D.W., C.J. Henny, C. Godinez-Reyes, F. Gress, E. Palacios, K. Santos del Prado, J.P. Gallo-Reynoso, and J. Bredy. 2013. Size and distribution of the California brown pelican metapopulation in a non-ENSO year. *Marine Ornithology* 41:95–106.
- Baumgartner, T.R., A. Soutar, and V. Ferreirabartrina. 1992. Reconstruction of the history of Pacific sardine and northern anchovy populations over the past 2 millennia from sediments of the Santa-Barbara Basin, California. *California Cooperative Oceanic Fisheries Investigations Reports* 33:24-40.
- Bechaver, C.A., G.J. McChesney, P.J. Capitolo, R.T. Golightly, A.R. Fuller, H.R. Carter, M.W. Parker, and S.J. Rhoades. 2013. Breeding population trends of Brandt's cormorants in the Monterey Bay Area, California, 2001-2011. Unpublished report. Humboldt State University, Arcata, CA and U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex, Fremont, CA. 43 pp.
- Beck, J., R. Carle, D. Calleri, and M. Hester. 2016. Año Nuevo State Park Seabird Conservation and Habitat Restoration 2015 Report. Unpublished report. Oikonos - Ecosystem Knowledge, Santa Cruz, CA. 44 pp.
- Elliott, M.L., R.W. Bradley, D.P. Robinette, and J. Jahncke. 2015. Changes in forage fish community indicated by the diet of the Brandt's cormorant (*Phalacrocorax penicillatus*) in the central California Current. *Journal of Marine Systems* 146:50-58.
- Essington, T.E., P.E. Moriarty, H.E. Froehlich, E.E. Hodgson, L.E. Koehn, K.L. Oken, M.C. Siple, and C.C. Stawitz. 2015. Fishing amplifies forage fish population collapses. *Proceedings of the National Academy of Sciences* 112: 6648–6652.
- Fuller, A.R., G.J. McChesney, S.J. Rhoades, C.S. Shake, C.A. Bechaver, M. Parsons, E.J. Taketa, J.D. Tappa, E. Haber, and R.T. Golightly. 2013. Restoration of common murre colonies in central California: annual report 2012. Unpublished report. U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex, Fremont, CA and Humboldt State University, Department of Wildlife, Arcata, CA. 71 pp.
- Gibble, C., K. Lindquist, R. Duerr, J. Lindsey, B. Bodenstein, R. Kudela, L. Henkel, J. Roletto, J. Lankton, J. Harvey. 2016. Investigation of a large-scale common murre (*Uria aalge*)

mortality event in California in 2015. Pacific Seabird Group Annual Meeting, Oahu, HI. Poster.

- Gibble, C., H. Nevins, G. McChesney, L. Eigner, S. Rhoades, P. Capitolo, S. Lyday, J. Hall, J. Roletto, J. Jahncke, S. Acosta, P. Warzybok, R. Bradley, B. Merkle, K. Schuler, and M. Bellizzi. 2010. The 2009 central California Brandt's cormorant (*Phalacrocorax penicillatus*) die-off and breeding failure event. Pacific Seabird Group Annual Meeting, Long Beach, CA. Abstract.
- Gress, F., P.R. Kelly, D.B. Lewis, and D.W. Anderson. 1980. Feeding activities and prey preference of brown pelicans breeding in the Southern California Bight. Unpublished report. California Department of Fish and Game, Sacramento, CA. 38 pp.
- Gress, F., D.B. Lewis, W.T. Everett, and D.W. Anderson. 1990. Reproductive success and status of brown pelicans in the Southern California Bight, 1988-1989. Unpublished report. California Department of Fish and Game, Sacramento, CA. 55 pp.
- Harvey, A.L. 2008. California brown pelican nesting parameters, prey distributions, and oceanographic conditions from 1986-2005. Unpublished M.Sc. thesis, San Diego State University. 50 pp.
- Horton, C. A. and R.M. Suryan. 2012. Brown pelicans: a new disturbance source to breeding common murre in Oregon? *Oregon Birds* 38(2):84-88.
- Jaques, D.L. 2014. Brown pelican injury prevention project: northern California harbors. Pacific Eco Logic report to the Kure/Stuyvesant Trustee Council. Unpublished report. 36 pp.
- Koehn, L.E., T.E. Essington, K.N. Marshall, I.C. Kaplan, W.J. Sydeman, A.I. Szoboszlai, and J.A. Thayer. 2016. Developing a high taxonomic resolution food web model to assess the functional role of forage fish in the California Current ecosystem. *Ecological Modelling* 335:87-100.
- MacCall, A.D., W.J. Sydeman, P.C. Davison, and J.A. Thayer. 2016. Recent collapse of northern anchovy biomass off California. *Fisheries Research* 175:87-94.
- McChesney, G. 2013. Electronic mail correspondence regarding brown pelican disturbance to common murre colonies. Dated May 17, 2013.
- McClatchie, S., J. Field, A.R. Thompson, T. Gerrodette, M. Lowry, P.C. Fiedler, W. Watson, K.M. Nieto, and R.D. Vetter. 2016. Food limitation of sea lion pups and the decline of forage off central and southern California. *Royal Society Open Science* 3:150628,
- Nevins, H., M. Miller, L. Henkel, D. Jessup, N. Carion, C. Meteyer, K. Schuler, J. St. Leger, L. Woods, J. Skoglund, and D. Jaques. 2011. Summary of unusual stranding events affecting brown pelican along the U.S. Pacific Coast during two winters, 2008-2009 and 2009-2010.

- NOAA National Marine Fisheries Service. 2016. Egg and larval production of the central subpopulation of northern anchovy in the Southern California Bight. Pacific Fishery Management Council, November 2016, Agenda Item G.4.a, SWFSC Report.
- Pacific Fishery Management Council. 2011. Coastal Pelagic Species Fishery Management Plan, as Amended through Amendment 13. www.pcouncil.org.
- Roth, J.E., N. Nur, P. Warzybok, and W.J. Sydeman. 2008. Annual prey consumption of a dominant seabird, the common murre, in the California Current system. *ICES Journal of Marine Science* 65:1046-1056.
- Sydeman, W.J., S.A. Thompson, J.A. Santora, A.J. Koslow, R. Goericke, and M.D. Ohman. 2015. Climate-ecosystem change off southern California: Time-dependent seabird predator-prey numerical responses. *Deep Sea Research Part II: Topical Studies in Oceanography* 112:158-170.
- Szoboszlai, A.I., J.A. Thayer, S.A. Wood, W.J. Sydeman, and L.E. Koehn. 2015. Forage species in predator diets: synthesis of data from the California current. *Ecological Informatics* 29:45-56.
- U.S. Fish and Wildlife Service. 1983. The California brown pelican recovery plan. Portland, OR. 179 pp.
- U.S. Fish and Wildlife Service. 2015. Letter to the Pacific Fishery Management Council regarding Pacific Fishery Management Council Agenda Item G.3 – Anchovy Update. Dated May 14, 2015.
- U.S. Fish and Wildlife Service. 2016. Letter to the Pacific Fishery Management Council regarding Pacific Fishery Management Council Agenda Items F.2 and F.3 – Stock Assessment Workshop Report and Anchovy Management Update. Dated August 18, 2016.
- Warzybok, P.M, R.W. Berger, and R.W. Bradley. 2013. Status of seabirds on Southeast Farallon Island during the 2013 breeding season. Unpublished report to the U.S. Fish and Wildlife Service. Point Blue Conservation Science, Petaluma, CA. Point Blue Contribution Number 1960.